3-1-1997

Mechka

Somchit Amornvorarat

Masters Thesis
"Mechka"
by
Somchit Amornvorarat

Submitted in Partial Fulfillment of the
Requirements for the Degree
MASTERS OF FINE ARTS

MFA IMAGING ARTS
SCHOOL OF PHOTOGRAPHIC ARTS AND SCIENCES
ROCHESTER INSTITUTE OF TECHNOLOGY

March,1997

Associate Professor Marla Schweppe Chair
Film/Video Department

Professor Jack Slutzky
National Technical Institute for the Deaf

Assistant Professor Stephanie Maxwell
Film/Video Department

PERMISSION GRANTED

"Mechka"

I, Somchit Amornvorarat, hereby grant permission to the Wallace Memorial Library at the Rochester Institute of Technology to reproduce my thesis paper in whole or part.
Any reproduction will not be for commercial use or profit.

Somchit Amornvorarat
March, 1997

"Mechka"

Table of Contents

Acknowledgments

1. My Goal
2. Thesis Proposal
3. Storyboarding and Animatic
4. Design of Character for Animation
5. Animation Production
    - Combine 2D and 3D testing
    - Background (3D)
    - Animation
    - Scanning and Pencil test
    - Making Quicktime
    - Transfer to Avid
6. Post Production
    - Avid Editing
    - Soundtrack
    - Problem and Solutions
    - Thesis Committee Meetings
7. The Final Conclusion

AppendixA Thesis Proposalss

AppendixB Storyboards

AppendixC Color Images

Reference List

Acknowledgments

I would like to thank my Dad, Mum, Aunt for their love and support during graduate school. I also would like to thank my thesis committee for their outstanding knowledge and advice: Marla Schweppe, Jack Slutzky, and Stephanie Maxwell. Not to forget all my lovely friends that made graduate school and living abroad a whole lot of fun: Andrew, Pat, Jackie, Simon, Robin, Tara, Lintz, George, Pete, Kent, Steve, Alex. Lastly the post production help from Sound Source, and especially Sax Communication who were essential in giving my film a professional quality.

For a better understanding of this thesis paper, I would like to invite you to view the computer animation I created for my thesis. A video tape of "Mechka" is on file in the Media Resource Lab in the "A" Floor or basement of the Wallace Memorial Library.

1. My Goal

I came to RIT, because of my interest in computer animation. I have a background in traditional animation and so wanted to develop personality in my computer created characters. Regardless of the medium I wanted the characters to be understood and enjoyable for the audience.

For these reasons, the goal I set myself was to bring the characters to life in traditional 2D, and at the same time use 3D for creating my backgrounds.

2. Thesis Proposal

I had a character of a polar bear cub in my mind that I wanted to develop and bring to life in a way that people could understand and have empathy for what would happen to him. Initially, I had written three stories and after a lot of discussion with my friends and professors I chose one to be my thesis.

Theme

A baby polar bear is sleeping close by to his mother. The mother bear is busy. She has her arm in the water and catches fish after fish. The cub wakes up, sits up and watches her closely. The mother has caught another fish. She pulls it up and it flaps it about on the ice.

The cub looks around the glacier that they are sitting on and sees another hole in the ice. He looks back at his mother again. The mother is still fishing. The cub stands up and walks towards the other hole which is located next to a large boulder. The cub sits down, puts his arm in the water and attempts to fish like his mother.

Meanwhile, from behind a rock, three penguins are secretly watching at the cub. One of them eagerly licks his lips, and the others laugh. They look at the cub as an opportunity to play a funny prank. They huddle together and plot.

The cub sees his mother pull up another fish while he still has sadly caught nothing. Suddenly, he catches hold and pulls up a little fish. It flaps about. He is scared. Eventually, the fish stops moving about, and the cub becomes very proud. He puts his arm in again and concentrates on catching more fish.

From behind the boulder sneak the three penguins. They pick up the fish and trot off again, back behind the boulder.

The cub pulls up a fish again and as he puts it down he discovers his first fish is missing. He looks around, very upset. He does not understand. He looks up at his mother who is looking down at him. The cub looks at the hole. He thinks the missing fish must have gotten into the water again.

The little cub puts his arm back in to the ice hole again and continues fishing. Again from behind the boulder sneak the three penguins. They pick up the cub's second fish and trot off with it as fast as they can. After a while, the cub turns his head and sees his second fish is now missing also. He stands up and becomes very upset again.

We see the penguins behind the rock. They are all eating the cub's fish very greedily. Meanwhile, the cub looks around to investigate. He sees the penguins footprints. He follows the footprints behind the rock where he sees the three penguins eating his fish. The cub is very angry. He starts growling at the penguins. The penguins, not at all scared, start laughing at him. The cub tries to growl louder, still the penguins only laugh.

The cub is making so much noise and concentrating so loud he doesn't notice that his mother has appeared behind him and bellowed out an angry roar at the penguins. The lead penguin stops laughing. The other two follow suit. They all look at each other. Towering above them is the little cub's mother growls down at them angrily. The penguins panic and they all run off as fast as they can (which is not very fast).

The cub is still unaware that the penguins have gone. He is still barking and growling. The mother moves off once again. The cub stops growling. The cub becomes aware that the penguins are gone. And thinking he was the one who make them go away, he becomes very proud of himself and returns to his fishing,$ feeling wiser for the experience.

Treatment

This will be a two dimensional character animation with three dimensional backgrounds. My three dimensional backgrounds will be generated in 3D Studio. It will be rendered in 256 colors and blurred slightly depending on the shot. This enables me to bring the 2D characters forward. The background (white snow and sky) is fairly similar in color to the foreground (polar bears etc.). This had potential problems of making the animation difficult to read. By changing the focus, color and using a black outline around my characters this problem was solved. My characters were drawn and scanned into Photoshop then exported into Macromedia Director. They were kept as sharp as possible so to bring them forward from the background. All the final layers were then composited in Macromedia Director.

3. Storyboarding and Animatic

Storyboarding is a crucial part of planning an animation or film. Storyboarding allowed me to translate the storytelling into pictures. Working out details like how, what, where, and when events were to happen and how to "set up the shot" by design to communicate the story progressively. This storyboard process allowed me to sit down and draw at the lightbox with a clear idea of what I had to do and what I had to plan for.

I divided the storyboard into three sections. The beginning, in which the relationship is established between the cub and the mother polar bear. The middle, in which the action happens when the cub starts fishing and the penguins show up to steal the fish. And the third, the conclusion in which the cub finds out the penguins have stolen his fish and he attempts to scare them off. My storyboards were often quick rough sketches where I might re-do each drawing until it was clear exactly what each shot had to communicate. I gave a great deal of time to the planning of each shot and how it related to the adjacent shots and to the story as a whole.

From the storyboards, I started my animatic. This gave detail for timing of each shot and helped me see the whole story together. I decided to do an animatic very differently than people might have expected. Rather than shoot

the storyboard and put it to video, I did my animatic in 3D. Mainly it helped me to learn more about 3D Studio. It gave me confidence in my abilities with the package, and allowed me to test bringing 2D artwork into 3D backgrounds and back again to get on idea of perspective and color.

After getting a rough animatic together with the color and 'mood' I wanted, I showed it to my committee. They pointed out problems about the timing in each shot. Some were too long. For example, connecting shots with little action. Others were too short. For example, the close ups that showed expression. Meeting with my committee at this early time in the production was very important and also boosted my confidence.

4. Design of Character for Animation

Character is very important in my story. I established the whole story on the relationship between the characters. I have one main character (Mechka) who is the male cub age between 2-4 years old. He is stubborn, inexperienced and keen to try and learn the ways of living from his mother. The mother polar bear, who is obviously very protective of her cub and is very strong, full of experience and wise to the dangers of their environment. The three penguins are greedy, and mischievous. They enjoy being mean and like to bully weaker or younger animals. Each of the three penguins has a different character; the clever one, the half clever one, and the stupid one.

After defining my characters, I started a lot of sketching. I drew different poses of polar bears and penguins. My references were watching animals at the zoo, picture books, documentaries of wildlife and photographs.

With a lot of sketches, I started to develop the design of the polar bear cub and the mother polar bear. Drawing them at the same time helped me in the relative size of figure between the cub and the mother polar bear. I based the design of the cub (Mechka) on a baby. He has a fatty body, fat stomach, short legs, and big head and eyes. The poses I drew showed walking, expressions and possible shots of the cub. The mother has a big strong body and a proportionally smaller head. I modeled the mother polar bear to the figure of a real polar bear. I also wanted to keep the design more graphic and simple. This helped me to animate easily readable poses.

The three penguins, I found quite difficult to design because penguins look so alike. They also show up together as a gang and were to be the same age. It was very important to show the difference in the personality of each penguin, the hierarchy, and who did the thinking. It was difficult to do, but soon became really fun working the penguins out. They were great characters to animate. I finally decided that the clever penguin would have the tall thin body, the half clever penguin the short and fat body and the stupid penguin the big strong body with a small, stupid head. I played around with proportions of each one changing size and detail. Eventually I started to see the 3D design. I became quite happy with the design of all the characters. I felt I could animate each one very comfortably. when I showed them to my

committee, they all immediately related to each character. I knew then that after all this preparation I was ready to begin production.

5. Animation Production

Combine 3D and 2D testing

As I started to do my animatic I began to see potential problems with the color. The background was very similar in tone to the foreground (Mechka). I was working in Micromedia Director which although being capable of using true color. It also slows the speed down significantly. So, I decided to use a 256 color palette. This was a crucial decision, I feel, that sped up the production of my movie. The white and soft blues in the background were automatically set up and chosen when I brought my 256 color flipbooks in from 3D Studio. I, then, chose tones or colors within this pallet that were most similar to the colors I wanted for my characters, and then changed them to the exact RGB that I needed to floodfill all the characters in.

For the original pencil test I tried several different ways of bringing in my drawings, and using as low memory for each to retain the quality that I needed to keep the black outline nice and crisp. By bringing the drawings in

as line art (black and white) I could easily floodfill the character as I needed. I found this worked very well. I applied the same technique to the penguins. After much testing I was able to keep the quality and colors I wanted and retain Director speed.

Backgrounds (3D)

Creating the 3D backgrounds was fairly simple but involved many steps. I took first of all a Corell "stock" photo CD of the south pole. It was basically a glacier scene with a blue/white sky.

This tiff file was then brought into photoshop and defocused. I brought the new tiff file (now blurred) into 3D studio as a background. I needed to build 3D glaciers and pools in front of the background. Using the perspective matching feature I got the correct camera angle and lens size. I built up the 3D scene of glaciers by taking a "viewpoint" desert scene and changing the red rocks to blue/white ice. With a boolean function I cut two holes in the ice. To simulate water holes, I created a spline mesh which was morphed into 6 stages of a water cycle. These were then lit and surfaced to look like deep arctic rock pools.

To position the rock pools correctly for Mechka and his mother was fairly complicated. It was trial and error until the 2D and 3D aligned correctly.

The 3D Studio scene and 2D blurred background were now lit and aligned perfectly to match up. I rendered 30 frames (The length of the pool water cycle). These were then brought into Photoshop. Each one was progressively blurred towards the back of the scene (simulating depth of field). The final 3D backgrounds were brought into Director.

Everything was lit and aligned perfectly. The soft colors and soft focus created an ideal background to set off my crisp 2D characters animation.

Animating

The first sequence I set out to animate was the cub, Mechka. I acted it all out physically myself, the way he walked and other behavior that was typical of a polar bear cub. I started to draw key frames and poses, in very rough form, that I felt he might do. After lots of 'roughs', I started to pay more attention to the details, such as body movement, weight and character. I concentrated on refining the drawing to its 'extreme'. Finally, when I got the exact pose that I felt communicated the story best, I began to inbetween and inbetween again. I found out that 15 frame per second was fine for my circumstances. I was able to calculate how many drawings I needed in each cycle. I pieced together the motion on an exposure sheet, organizing what primary and secondary animation was to take place and when it should begin, etc.

Also, I found that having a big mirror in front of me was very helpful to see myself acting out. The more I drew different poses the more I felt comfortable with the drawing.

I put myself inside the characters. Drawing the poses that communicated clearly what they felt was very hard. At other times, I would concentrate on working out a cycle that was interesting and would reduce the amount of time drawing. If there was an occasional short cut that I could take to get that shot done I tried to take it. My movie was a mixture of straight ahead and cycle animation. The two blended well.

Scanning and Pencil test

The scanning is one the most important parts of this production. It is equivalent, in the workflow, of shooting animation onto film. Before, I started scanning, I found that my drawing outline had to be very black and thick The lines should all join up clearly because after scanning the drawing always lost quality compared to the pencil originals. If the lines did not meet clearly it meant when I started to floodfill color it would seep out, into the background. To save time when working, I found it better to make all the outlines thick and joined up with either a dark pencil or pen. I set the scanner up with the following preferences.

1. Line art

2. The resolution was 75 dots per inch (using this resolution can save a lot of memory, and works more quickly since I am not using so much RAM and yet keep my scans high quality

3. I adjusted the contrast to get the black line as dark as possible and the whites as light as possible.

After scanning in all the drawings, I saved them in Pict file format. These Pict files were then imported into Micromedia Director. I began cleaning up the odd black pixels around the drawings. Now the drawings were clean and ready for a pencil test.

The Pencil Test

The idea of pencil test is to help to see what the animation looks like before starting to work on details such as in-between, floodfill, and secondary motion. One of the best features about doing pencil tests is that it lets one play around with getting the right timing.

I constantly checked my animation with the pencil test previews. For this reason, the pencil test saved me alot of time before I started to work in detail. If I found it was not working quite right in the pencil test, I am able to change and discuss it with someone on my thesis committee.

Making a Quicktime

After each shot of animation was done, including the 2D/3D compositing in Micromind Director, I made a kind of advanced Quicktime movie.

Quicktimes involve bringing in the individual Director frames into the Quicktime module, setting the bit depth, compression type and frames per second in which the final quicktime movie will play. In order to complete each part of the production on time I had to have enough memory and space on the harddrive, which depended on the complexity of each shot. I could have purchased more RAM but that seemed expensive. Since my animation was only 256 colors and each shot did not have a big script, the memory and space restrictions were not a problem. One real problem, I did find however, was that after making Quicktimes was that I lost the quality of color from the original Director files. Because I have had some experience with this problem before I found that using another piece of software called "Convert to Movie" made a real difference in quality while making Quicktimes. Basically, "Convert to Movie" is a customized package that first brings in each rendered Pict file. Then it does a second pass, customizing the palette in the process to get the nicest quality possible and still be a Quicktime and play at the correct speed.

Transfer to Avid

Each shot was saved on a portable harddrive in Quicktime format. Once on the harddrive, all the files were transferred to an Avid. An Avid is a dedicated Mac designed for non-linear editing. By choosing the Avid to edit on, I kept the quality of my work high because it is all kept digitally.

The Avid offered some flexibility in the playback speed of the shots. Each shot could be played in 'real time', the actual speed at which it was animated or it could be sped up or slowed down. Another helpful feature was the capability to pick certain frames and move them around. This helped give me a lot of choice editing.

6. Post Production

Avid Editing

In this step of the production, it was really fun to see all the pieces come together. The movie was far from perfect after some rough editing. Some shots I found did not work the way I wanted.

The criticism from my thesis committee was very helpful at this time. The first rough cut is always a shock. Seeing the movie for real rather than how you hope it will be always is a shock.

Soundtrack

For the soundtrack, I wanted music from the 1920's. It had to be fun and have rhythm which I had designed into my animation. My characters had a 20's appeal and the 20's 'felt' right.

I listened to alot of music and soundtracks to get an idea. Eventually, I found the music that I wanted 'The Little Rascals Collected Soundtracks'. I had a few choices of music from this CD source that I thought it would fit. By playing the whole film and listening to the music while watching the visuals. I was able to pick the tunes that I like most.

I mixed my sound effects on the computer using Sound Edit Pro. The SFX included water, wind, growling, etc. I re-recorded them with music on a portable 4 track studio. Then after the recording was done I mixed the finished 4 track master onto a DAT tape and brought the DAT to the editing studio to be put onto the edited master of my movie. Some sound effects were still needed so with a microphone in the studio I recorded the 'voices' of the characters myself. This was a bit embarrassing but funny for everyone else.

Problems and Solutions

When I finished the production I was very satisfied. One of the hardest things, and ultimately the most rewarding was disciplining myself to carry the project through to its conclusion.

Breaking the enormous project into the workflow I have written about helped me a great deal. Movies are very hard to make, and the only way to pull them off is by disciplining yourself to complete one bit everyday. You build up momentum this way and eventually see the end approaching.

There was alot of pre-production which was another factor for me in getting it done. At every stage of the production I knew exactly what I had to do next. I knew what the characters thought, and what I was setting up to happen next.

Not all aspects were successful, and some bits that did not seem very good in the storyboard or animatic came together really well in the final film. You only really know when its completed. I suppose that's half the fun of it.

The final movie is only one part of the learning process. Almost more importantly is the getting there. For me it was all the different stages in the work flow that made it so rewarding. And then at the end seeing those individual elements together in the movie is amazing. Too often we forget it's not 'when' we get done but 'how' we get done that matters.

In conclusion, I must say that most of the time the actual work came together pretty well. People seem to really like Mechka, and that makes me happy.

Thesis Committee Meetings

My thesis committee meeting were a great help to me. Although I was unable to get all three professors together at the same time, their separate suggestions greatly helped throughout the production of Mechka. It was hard to make all the changes that they suggested. Each professor had a different suggestion for solutions.

At first I was very worried to meet with my thesis committee and to hear their differing opinions about my work. I felt that this film was something very personal, and I really wanted everybody to like it. It was not until I realized that they only ever 'suggested' alterations that I could relax and hear what they had to say.

Eventually, I had to meet with them to get the film approved and receive my degree. They were my professors for a reason. They were very knowledgeable in animation and filmmaking. I am grateful for all their help throughout my project. In hindsight, it is good that their opinions differed so that I was allowed to listen and make up my own mind.

7. The final Product: Conclusions

The production and animation Mechka was an extremely rewarding experience. I am very proud of the final version of Mechka. I feel that I learned alot from this production. I fulfilled what I set out to accomplish, in many circumstances, exceeding my own expectations.

Mechka in Russia, means the little bear cub.

APPENDIXA Thesis Proposal

Graduate Computer Animation Thesis Proposal

Somchit Amornvorarat (Tuk)

Polar Bear

Marla Schweppe

_____ _____

Jack Slutzky

_____ _____

Stephanie Maxwell

_____ _____

Thesis proposition

I have a character of a polar bear cub in my mind that I want to bring the bear to life in away that will enable people to understand and have empathy for what is happening to him.
I have written three stories that I feel does this and I will propose chosen my favorite here.

Theme

A baby polar bear is sleeping close to by his mother. The mother bear is busy fishing. She has her arm in the water engaged in fishing. The cub wakes up, sits up and watches her. The mother has caught another fish. She pulls it up and it flaps it about on the ice.

The cub looks down the glacier that they are sitting on and sees another hole. He looks back at his mother again. The mother still fishing. The cub stands up and walks towards the other hole. The other hole next to a large boulder. The cub sits down, puts his arm in the water and attempts to fish like his mother.

Meanwhile, from behind a rock, three penguins are looking down at the cub. One of them eagerly licks his lips, the others laugh. They look at the cub as their target. They have a huddle to plot.

The cub sees his mother pull up another fish and he still has nothing. Suddenly, He catches hold and pulls up a little fish. It flaps about. He is scared. Eventually, the fish stops moving about, and the cub is proud. He puts his arm in again and concentrates on catching more fish.

From behind the boulder trot the three penguins. They pick up the fish and trot off again behind the boulder.

The cub pulls up a fish again and puts it down discovers his first fish is missing. He looks around, quite upset. He does not understand. He looks up at his mother who is looking down at him. The cub looks at ~~the other~~ hole. He thinks the missing fish is there. ~~He moves to the next hole~~

The little cub puts his arm back in to the ice again to continue fishing and again from behind the boulder trot the pack of penguins, pick up the second fish and trot off with it as fast as they can.

After a while the cub turns his head and sees his second fish also gone. He stands up and becomes very upset again.

We see the penguins behind the rock. They are all laughing uncontrollably whiles sounding very evil. The main penguin who is laughing the loudest looks back at the other two penguin who have stopped laughing, they have stony faces and begin to slowly walking backwards.

The lead penguin looks around back and in front of him, towering above him is the little cubs mother. She growls down at them angrily. The other two penguins point at him panicking and trot off as fast as they can (which is not very fast).

The mother bear grabs the penguin and begins to taunt him, showing the penguin what it is like to be picked on by someone who is bigger. The mother bear tosses the penguin far into the water.

The little cub joins his mother and the last penguin runs away also leaving the fish and both bears.

The cub trots after him a little stops and squeaks a little bark at the disappearing penguins and walk back to his mother proud of himself once more. The cub returns to his fishing feeling wiser for the experience.

Treatment

This will be a two dimensional character animation with three dimensional backgrounds. My three dimensional background will be generated in vista pro. A fractal landscape modeled. It will be rendered in 24 bit color and blurred slightly in 3D studio. My characters will be two dimensional in 8 bit color. They will not be blurred so to bring them forward from the background. All the final images I will composite in 3D studio.

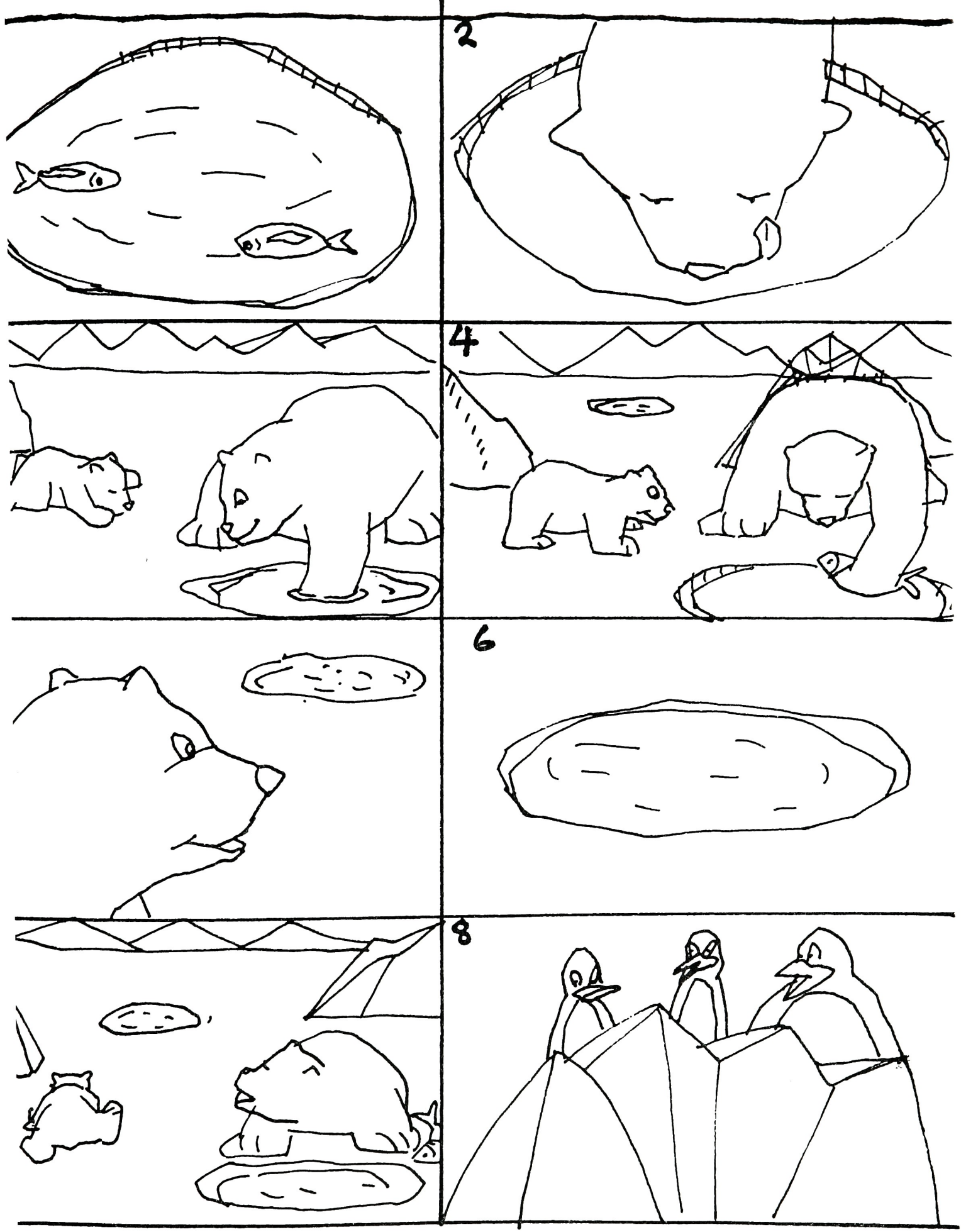
Budget

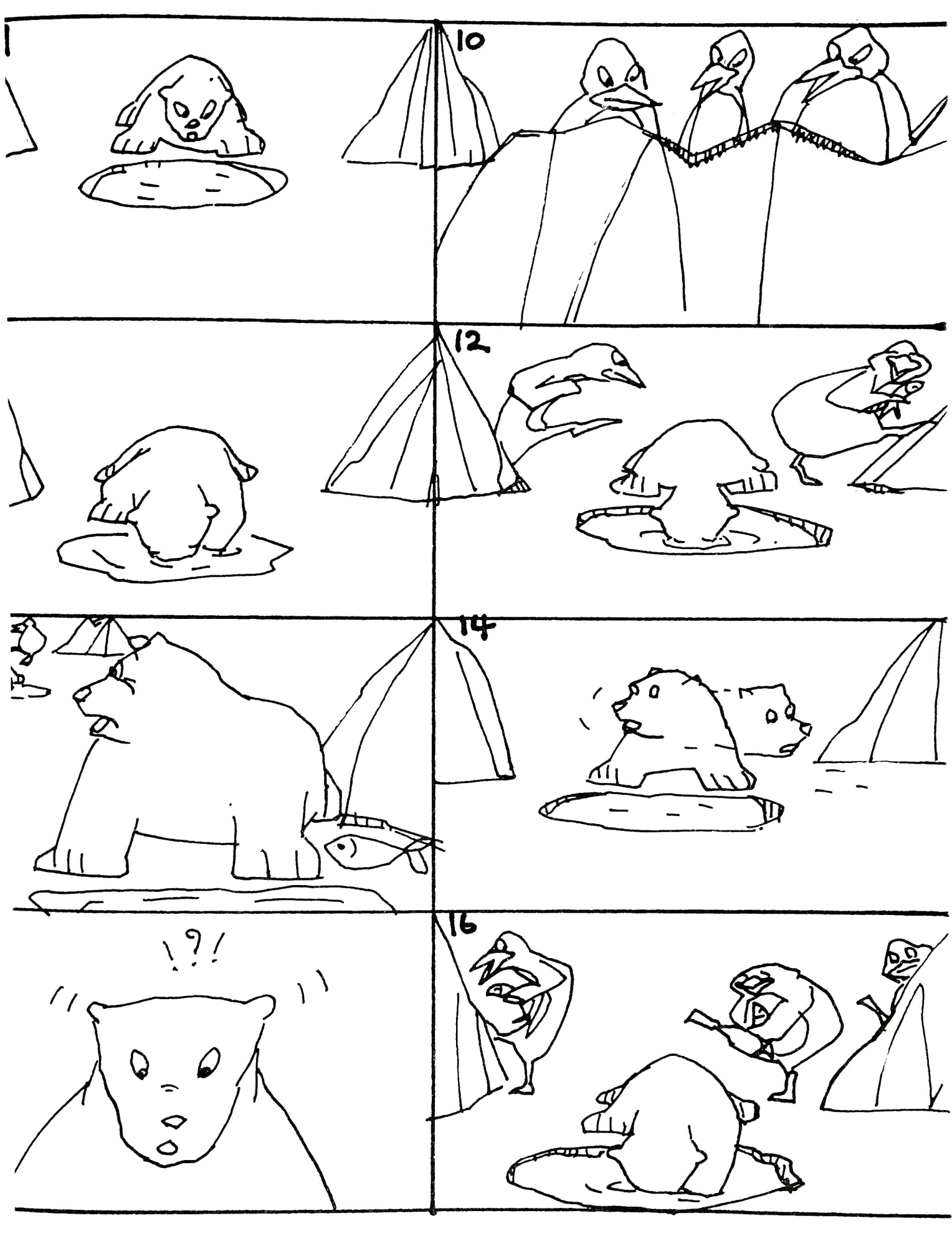
	Cost	In-Kind	Actual
Animator	$20,000	$20,000	$0
Computer	$2,000	$2,000	$0
Software	$3,000	$3,000	$0
Bernoulli disks	$300	$0	$300
Video tapes	$60	$0	$60
Editing time	$1000	$1000	$0
Animation paper	$200	$0	$200
TOTALS	$26,560	$26,000	$560

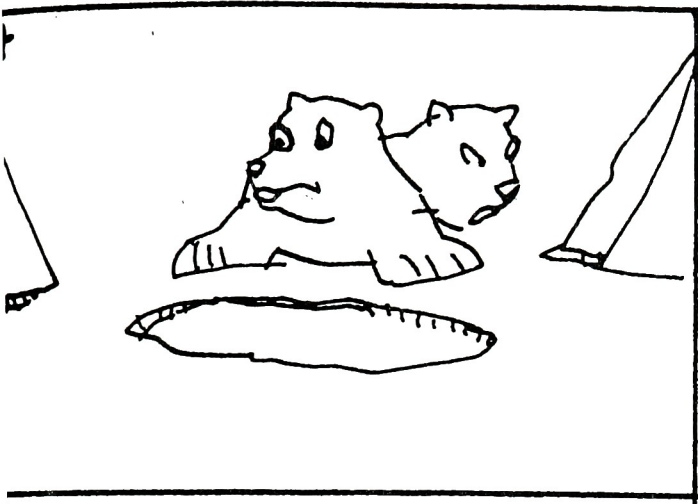
Timeline

September	Story development
October	Storyboarding
November	Animatic
	Testing 2D/3D combination
December	Modeling Backgrounds
January	Rendering Backgrounds
February	3/4 of the Animation
March	1/4 of the Animation
April	Recording
May	Editing and sound
June	Writing the thesis paper
July	
August	

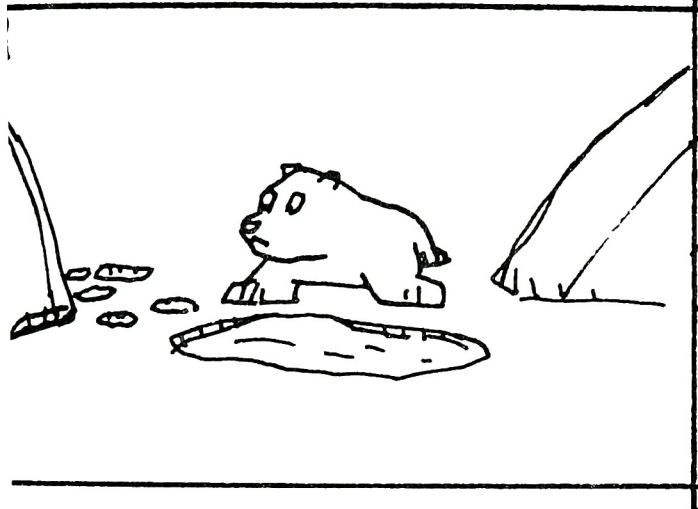
APPENDIXB Storyboards


2
4
6
8

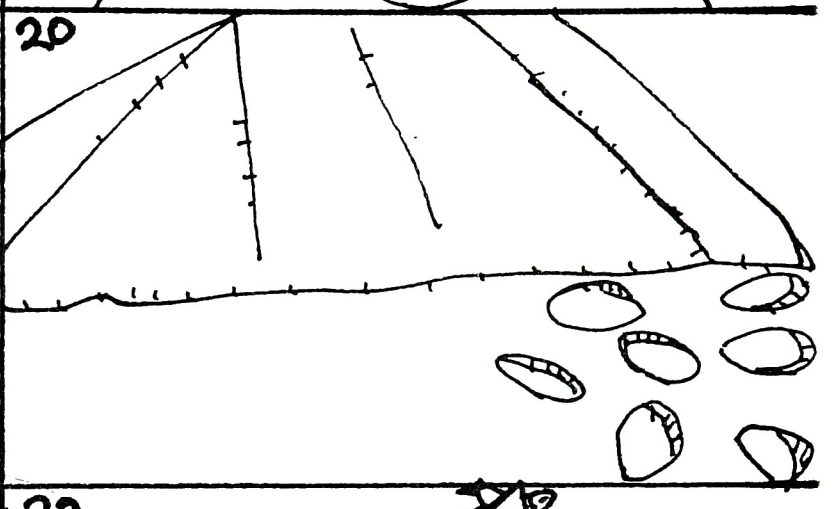

10
12
14
16
!?!

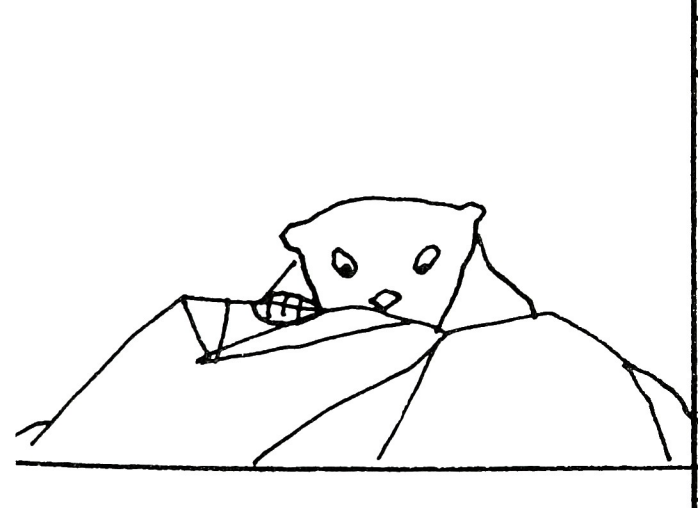


18

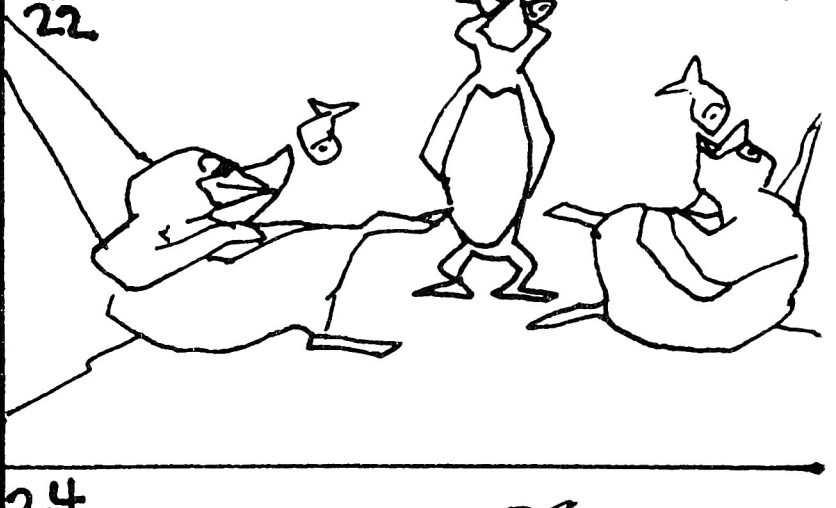


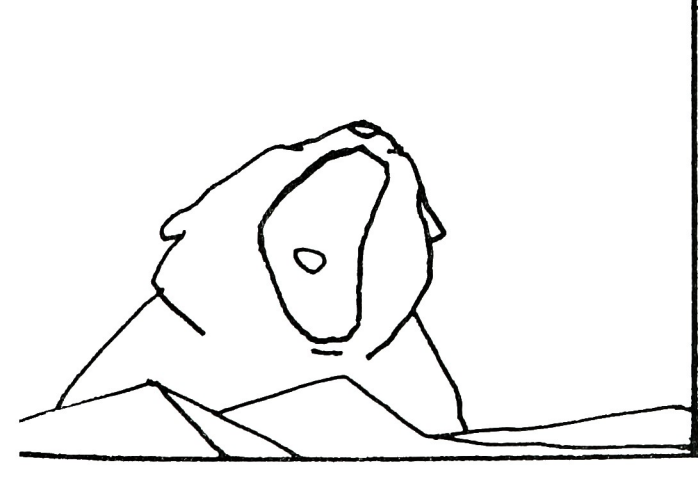
20



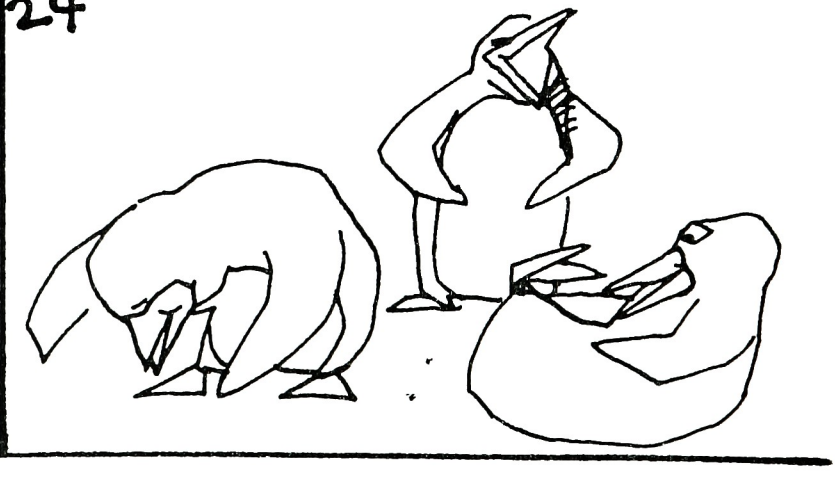


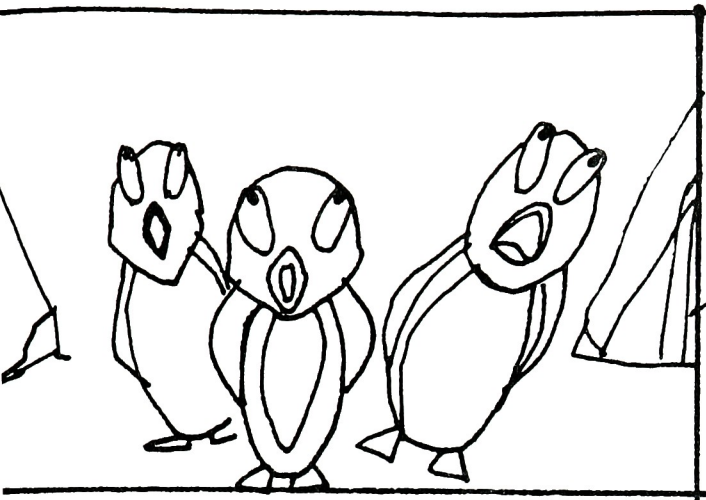
22

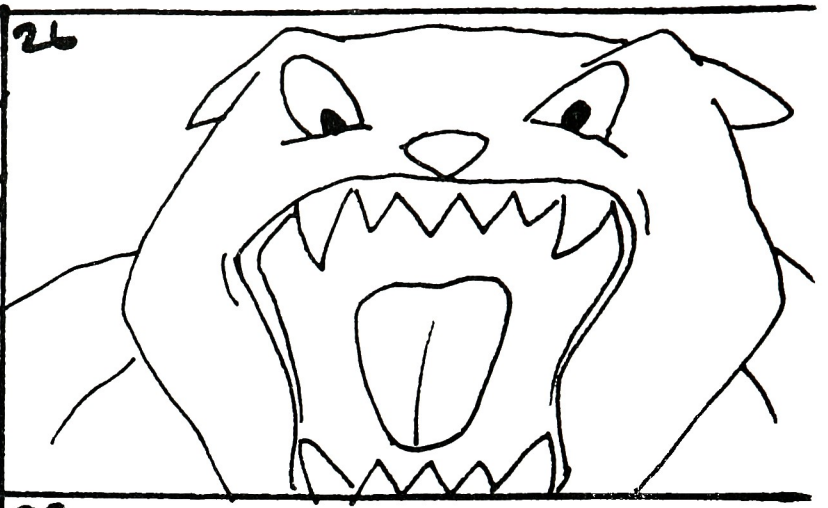


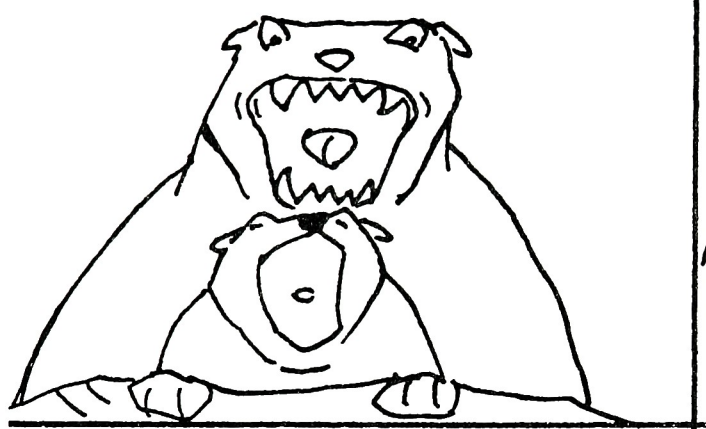


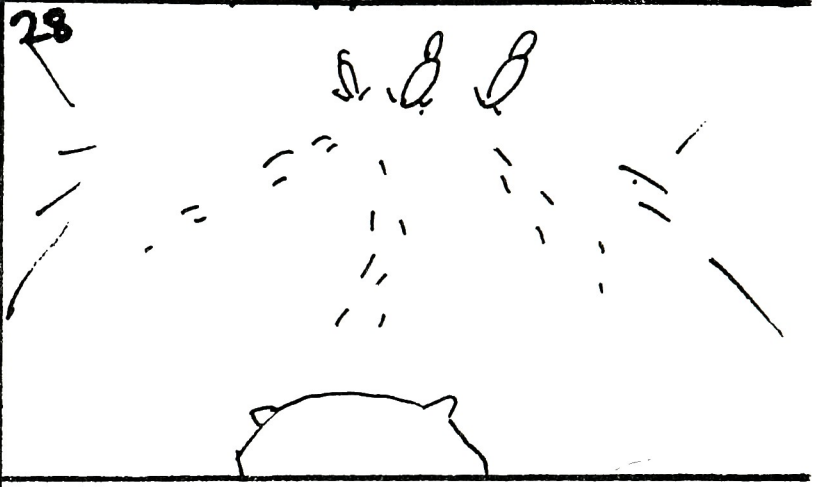
24

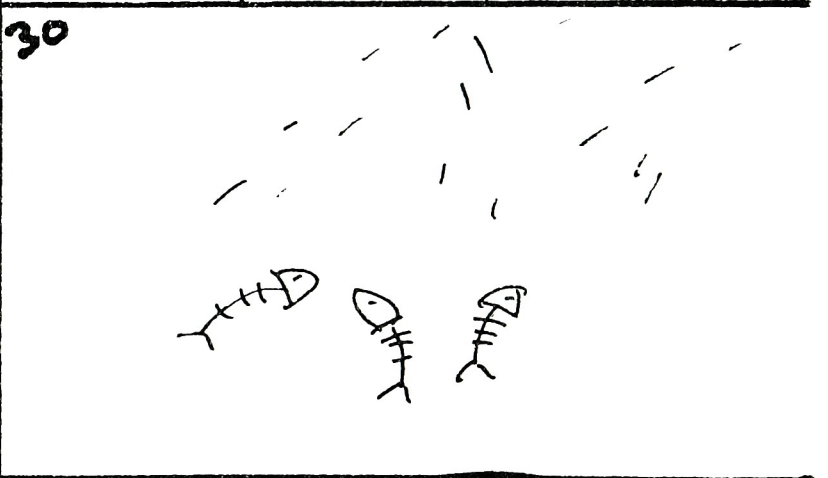


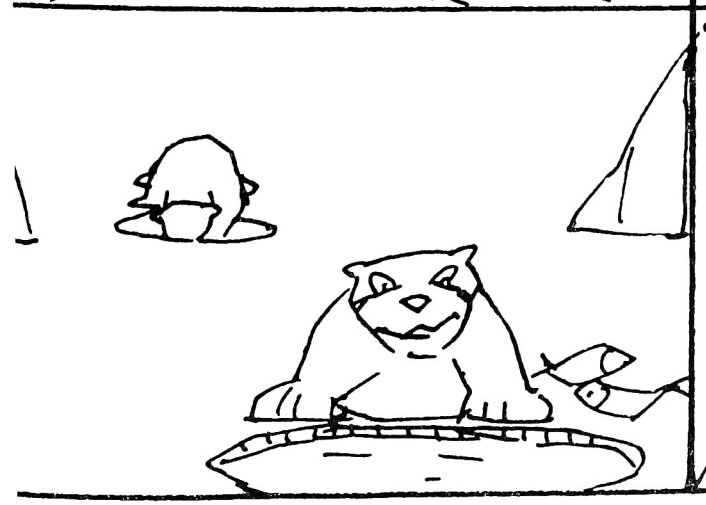


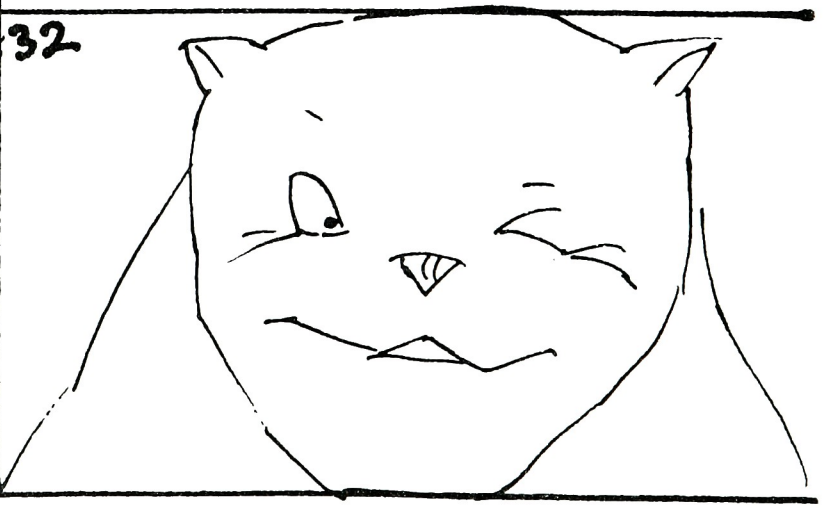

26



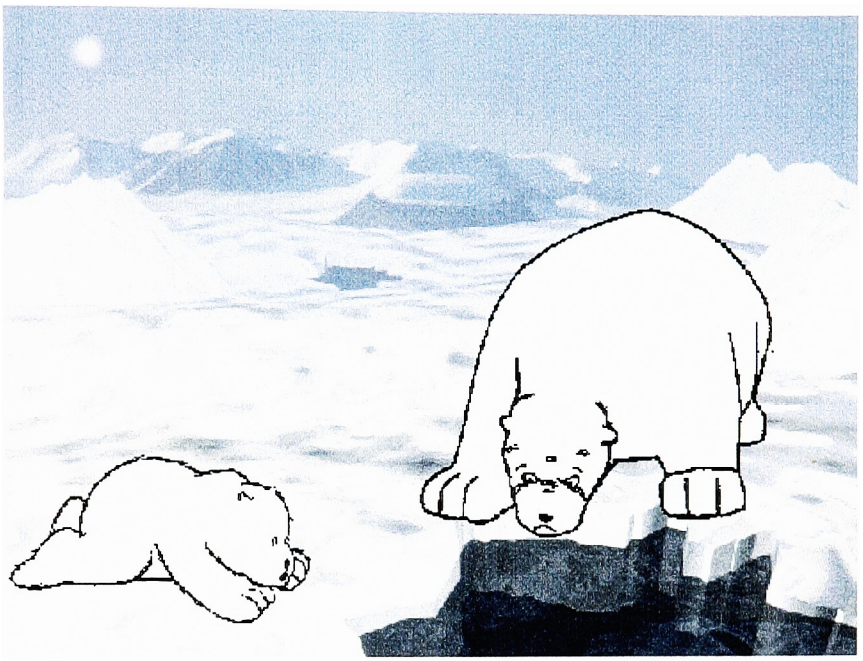

28

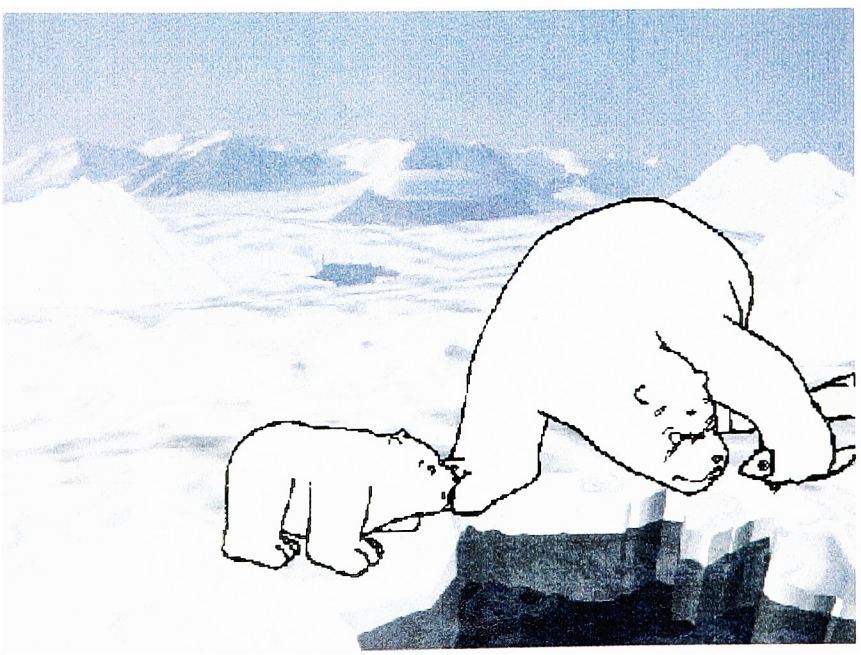

30

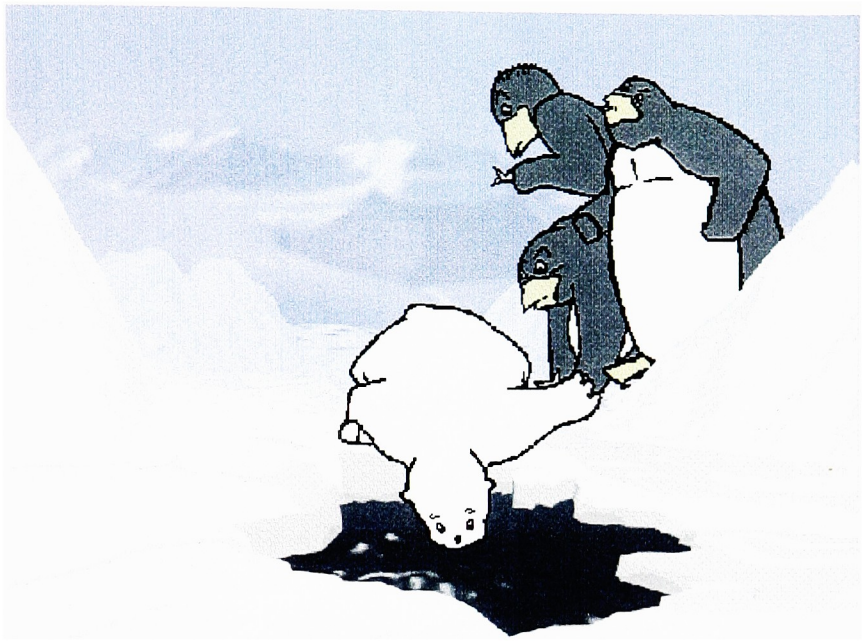


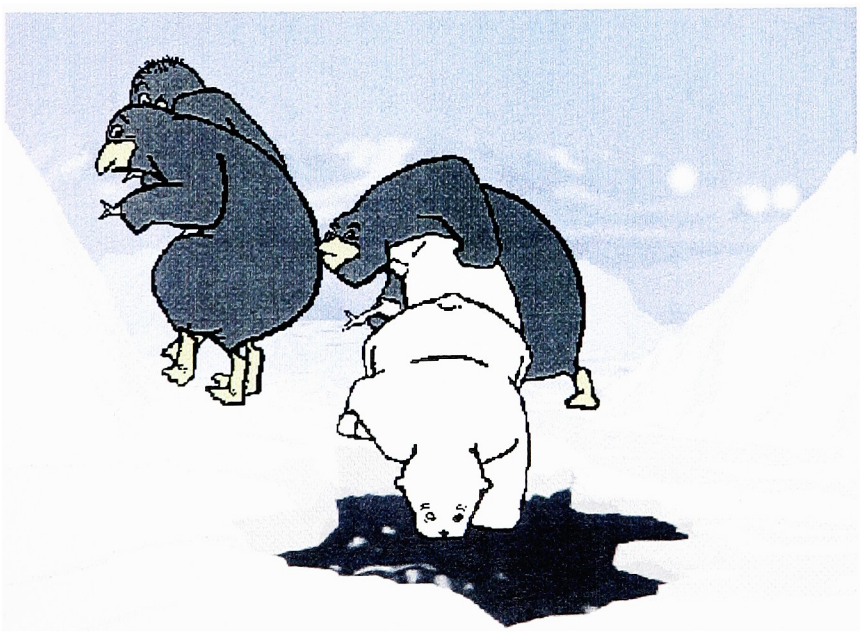

32

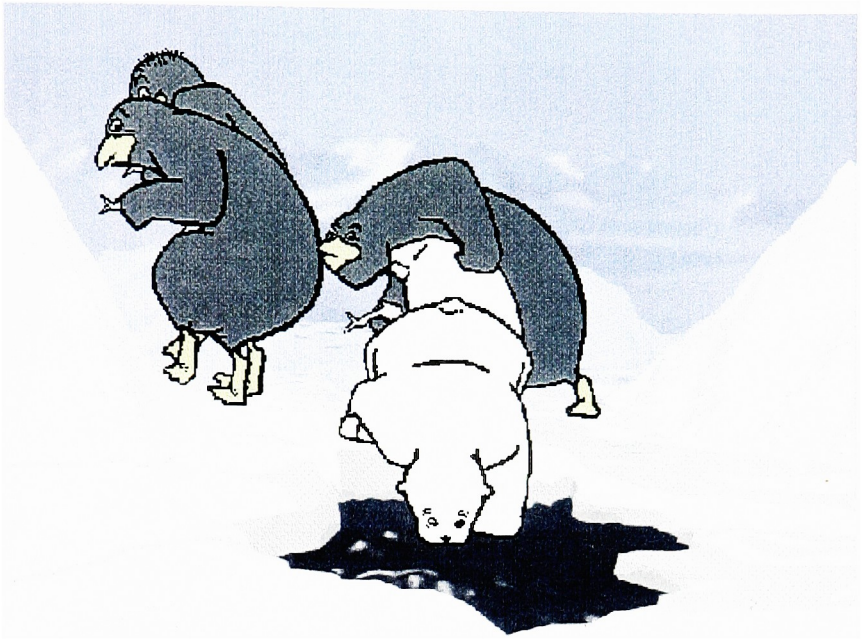
APPENDIXC Color Images

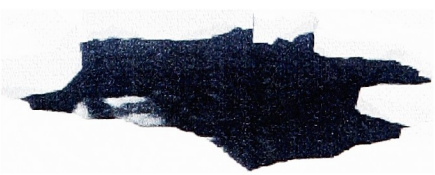


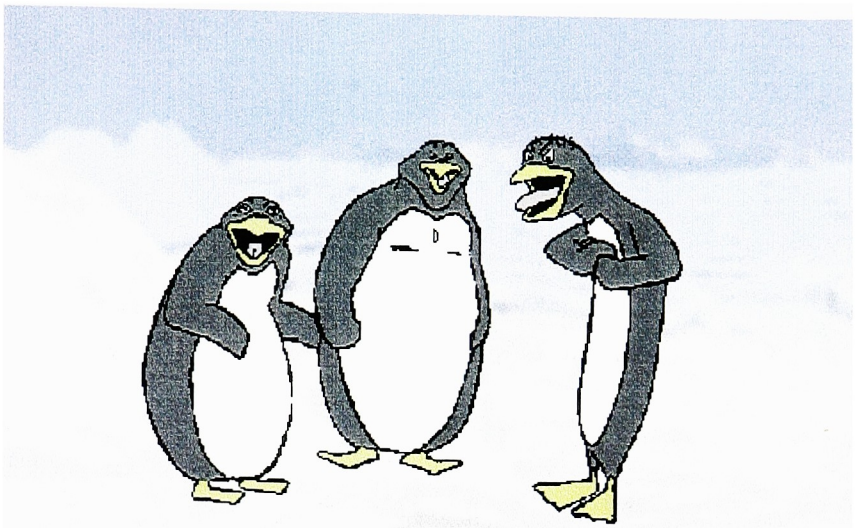


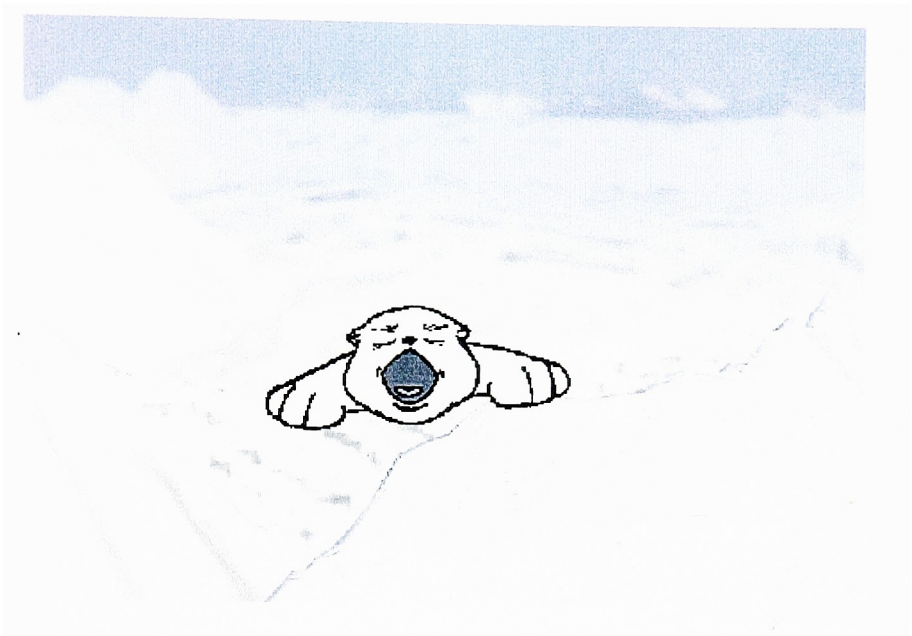


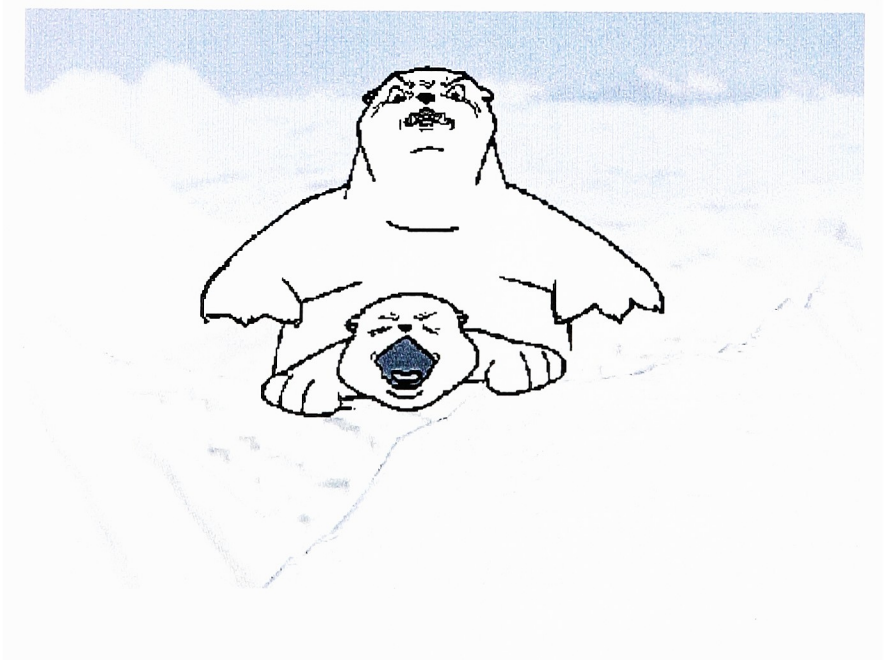


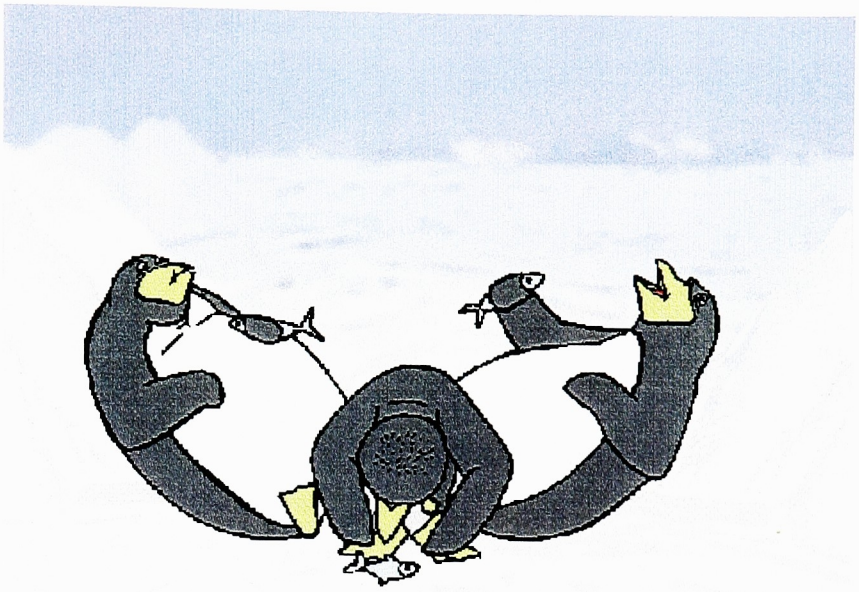


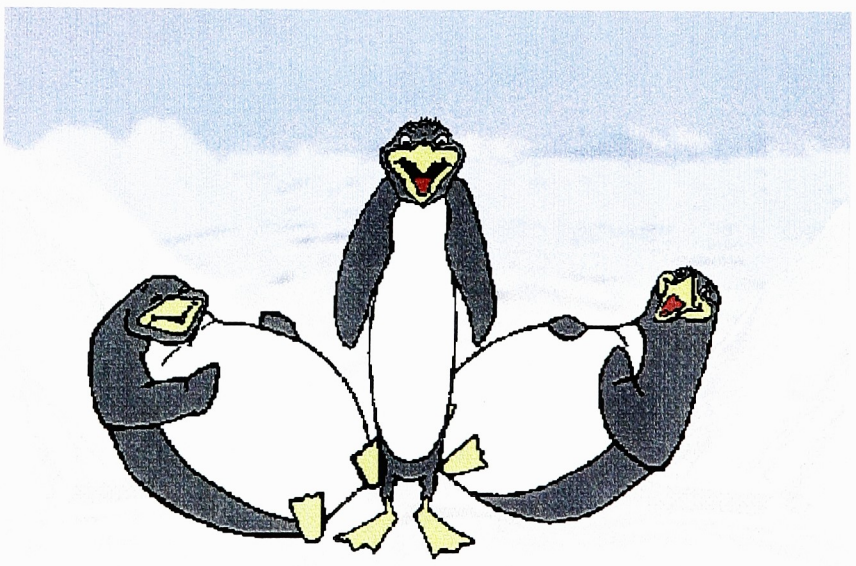


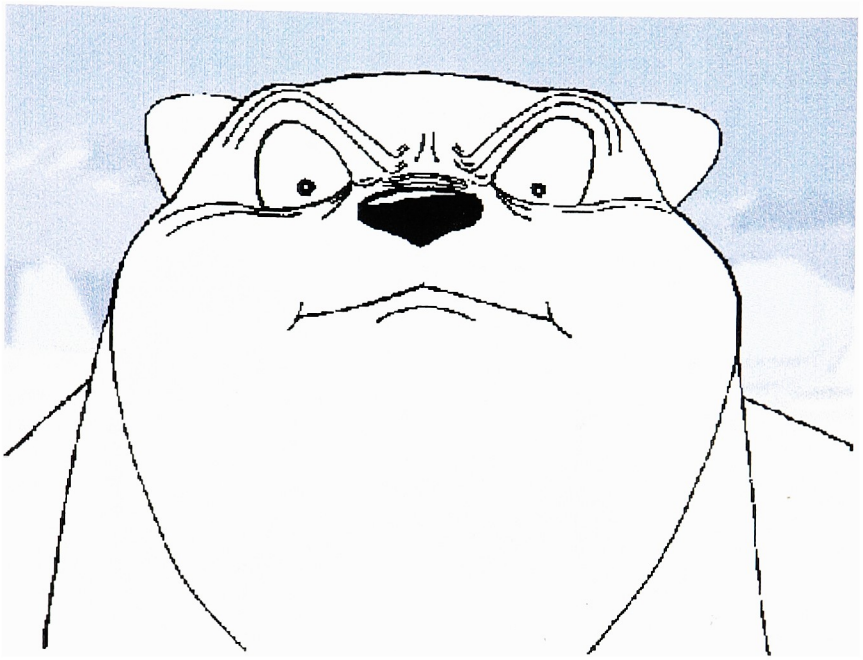


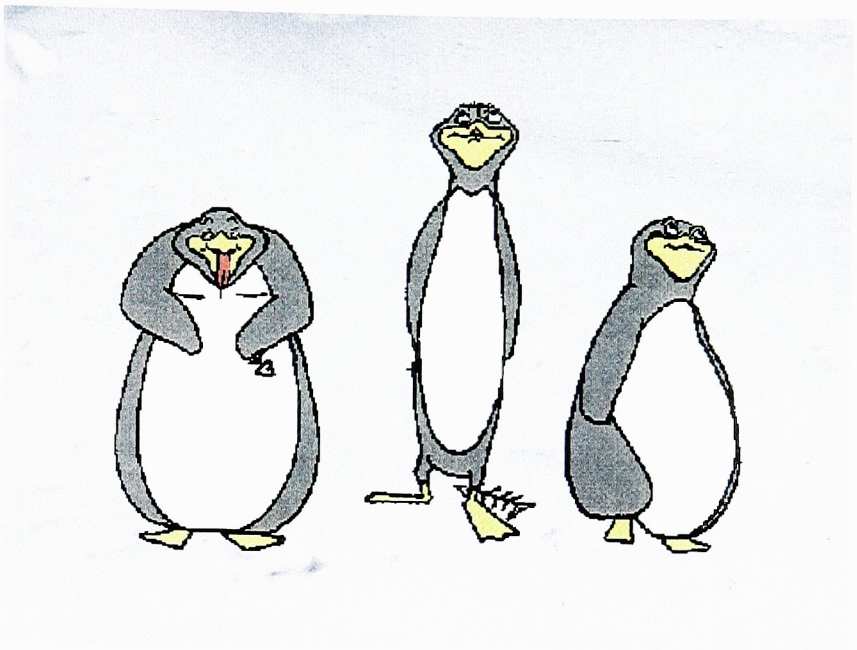


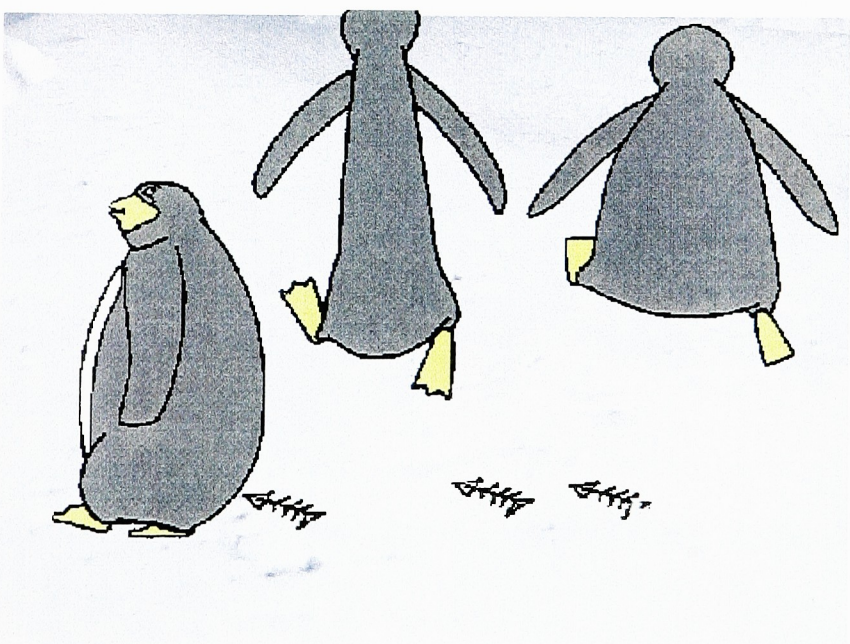












References

Bailey, Jill and Green, John. **Polar Bear.** Gallery Books:New York, 1991.

Blair, Preston. **How to Draw Carton Animation.** Walter Foster:New York, 1980.

Brion, Patrick. **Tom and Jerry: The Definitive Guide to their Animation Adventures.** Harmony Book: New York, 1990.

Gorman, James. **The Total Penguin.** Prentice hall Editions: New York, 1990.

Halas, John and Whitaker, Harold. **Timing for Animation.** Focal Press:New York, 1981.

Kaehler, Wolfgang. **Penguins.** Chronicle Book: San Francisco, 1989.

Stirling, Ian and Kirshner, David. **Bear Majestic Greatures of the Wild.** Rodal Press: Pennsylvania, 1993.

Thomas, Frank and John, Ollie. **The Illusion of Life Disney Animation.** Hyperion: New York, 1981.